AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A membrane electrode assembly comprising a pair of opposing electrodes each having a catalytic layer, and a polymer electrolyte membrane sandwiched by said electrodes, part of said catalytic layers being projecting into said polymer electrolyte membrane, wherein the projection depth of said catalytic layer is 0.5 μm or more and less than 5 μm.

Claim 2. (canceled)

Claim 3. (canceled).

4. (original): The membrane electrode assembly according to claim 1, wherein the DC resistance of said polymer electrolyte membrane in a thickness direction determined by impedance measurement is 90% or less of the DC resistance of a membrane electrode assembly having the same structure except that part of catalytic layers do not project into a polymer electrolyte membrane.

5. (currently amended): A membrane electrode assembly comprising a polymer electrolyte membrane, said polymer electrolyte membrane having a softening point of 120°C or more, and a Q value of 0.09-0.18 C/cm^2,

wherein the Q value is measured on:

a polymer electrolyte membrane electrode assembly comprising a polymer electrolyte membrane and an electrode formed on only one surface of the membrane, in which the polymer electrolyte membrane electrode assembly is contacted with an aqueous sulfuric acid solution of pH1 on a side free from the electrode and with nitrogen gas on the side of the electrode, where a voltage from -0.1 V to +0.7 V is applied and the Q value in C/cm^2 is determined from the proton peak area on the adsorption side.

6. (original): The membrane electrode assembly according to claim 5, wherein said membrane electrode assembly has a structure in which said polymer electrolyte membrane is sandwiched by a pair of opposing electrodes each having a catalytic layer, part of said catalytic layers projecting into said polymer electrolyte membrane.

7. (original): The membrane electrode assembly according to claim 6, wherein the projection depth of said catalytic layers into said polymer electrolyte membrane is 0.5 μm or more and less than 5 μm.

8. (original): The membrane electrode assembly according to claim 6, wherein when there are arbitrary two points, whose linear distance is 10 μm or more, in an interface of said polymer electrolyte membrane with each of said catalytic layers, the distance along said interface is longer than said linear distance by 15% or more on average.

9. (original): The membrane electrode assembly according to claim 6, wherein the DC resistance of said polymer electrolyte membrane in a thickness direction determined by

impedance measurement is 90% or less of the DC resistance of a membrane electrode assembly having the same structure except that part of catalytic layers do not project into a polymer electrolyte membrane.

10. (previously presented): A membrane electrode assembly comprising a pair of opposing electrodes each having a catalytic layer, and a polymer electrolyte membrane sandwiched by said electrodes, part of said catalytic layers being projecting into said polymer electrolyte membrane, wherein the projection depth of said catalytic layer is 0.5 μm or more and less than 5 μm, and

wherein said polymer electrolyte membrane is made of a sulfonated hydrocarbon polymer that may contain oxygen in its skeleton or other substituent groups than a sulfonic group, wherein the sulfonated hydrocarbon polymer is selected from the group consisting of sulfonated polyetheretherketone, sulfonated polysulfone, sulfonated polyethersulfone, sulfonated polyetherimide, sulfonated polyphenylene sulfide and sulfonated polyphenylene oxide.

Claim 11. (canceled)

12. (previously presented): The polymer electrolyte fuel cell constituted by stacking a plurality of said membrane electrode assemblies according to claim 1 via separator plates.

Claims 13-15 (canceled).

16. (previously presented): A membrane electrode assembly comprising a polymer electrolyte membrane, said polymer electrolyte membrane having a softening point of 120°C or

more and a Q value of 0.09-0.18 C/cm^2, wherein said polymer electrolyte membrane is made of a sulfonated hydrocarbon polymer that may contain oxygen in its skeleton or other substituent groups than a sulfonic group, and wherein the sulfonated hydrocarbon polymer is selected from the group consisting of sulfonated polyetheretherketone, sulfonated polysulfone, sulfonated polyethersulfone, sulfonated polyetherimide, sulfonated polyphenylene sulfide and sulfonated polyphenylene oxide.

17. (previously presented): The polymer electrolyte fuel cell constituted by stacking a plurality of said membrane electrode assemblies according to claim 5 via separator plates.

18. (previously presented): A membrane electrode assembly comprising a polymer electrolyte membrane, said polymer electrolyte membrane having a softening point of 120°C or more and a Q value of 0.09-0.18 C/cm^2, wherein the Q value is measured on:

a polymer electrolyte membrane electrode assembly comprising a polymer electrolyte membrane having a thickness of about 20-60 μm, and an electrode formed on only one surface of the membrane, the electrode comprising a catalytic layer and a gas-diffusion layer, which polymer electrolyte membrane electrode assembly is contacted with an aqueous sulfuric acid solution of pH1 on a side free from the electrode and with nitrogen gas on the side of the electrode, whereafter a voltage is applied between the gas diffusion layer and the aqueous sulfuric acid solution, whereafter by a scanning voltage from -0.1 V to +0.7 V, the Q value in C/cm^2 is determined from the proton peak area on the adsorption side, measurement being conducted at 85°C, wherein the catalytic layer used to measure the Q value comprises platinum

particles carried on carbon black particles dispersed in an ion-conducting binder having an ion exchange capacity of 1-2.6 meq/g, the weight ratio of the platinum particles to the carbon black particles being 1/4-2/1 and the weight ratio of the platinum particles plus carbon black particles to the ion-conducting binder being 1/2-3/1, and wherein the gas-diffusion layer comprises carbon black particles and particles of polytetrafluoroethylene at a weight ratio of 1/3-5/1 coated on one surface of a support layer to form a primary layer on the support layer, wherein platinum is coated on the primary layer in an amount of 0.5 mg/cm^2 to produce a catalytic layer of the electrode.

19. (previously presented): The membrane electrode assembly according to claim 18, wherein said membrane electrode assembly has a structure in which said polymer electrolyte membrane is sandwiched by a pair of opposing electrodes each having a catalytic layer, part of said catalytic layers projecting into said polymer electrolyte membrane.

20. (previously presented): The membrane electrode assembly according to claim 19, wherein the projection depth of said catalytic layers into said polymer electrolyte membrane is 0.5 μm or more and less than 5 μm.

21. (previously presented): The membrane electrode assembly according to claim 19, wherein when there are arbitrary two points, whose linear distance is 10 μm or more, in an interface of said polymer electrolyte membrane with each of said catalytic layers, the distance along said interface is longer than said linear distance by 15% or more on average.

22. (previously presented): The membrane electrode assembly according to claim 19, wherein the DC resistance of said polymer electrolyte membrane in a thickness direction determined by impedance measurement is 90% or less of the DC resistance of a membrane electrode assembly having the same structure except that part of catalytic layers do not project into a polymer electrolyte membrane.

23. (previously presented): A membrane electrode assembly as claimed in claim 5,

wherein said polymer electrolyte membrane is made of a sulfonated hydrocarbon polymer that may contain oxygen in its skeleton or other substituent groups than a sulfonic group, wherein the sulfonated hydrocarbon polymer is selected from the group consisting of sulfonated polyetheretherketone, sulfonated polysulfone, sulfonated polyethersulfone, sulfonated polyetherimide, sulfonated polyphenylene sulfide and sulfonated polyphenylene oxide.

24. (previously presented): A membrane electrode assembly as claimed in claim 18,

wherein said polymer electrolyte membrane is made of a sulfonated hydrocarbon polymer that may contain oxygen in its skeleton or other substituent groups than a sulfonic group, wherein the sulfonated hydrocarbon polymer is selected from the group consisting of sulfonated polyetheretherketone, sulfonated polysulfone, sulfonated polyethersulfone, sulfonated polyetherimide, sulfonated polyphenylene sulfide and sulfonated polyphenylene oxide.

25. (new): A membrane electrode assembly obtained by hot-pressing a polymer electrolyte membrane sandwiched by a pair of opposing electrodes in a state that 3-20 weight% of an organic solvent based on said polymer electrolyte membrane remains in said polymer

electrolyte membrane, said polymer electrolyte membrane being made of a sulfonated hydrocarbon polymer having a softening point of 120°C or higher, which may contain oxygen in its skeleton or other substituent groups than a sulfonic group, whereby said assembly has a Q value of 0.09-0.18 C/cm^2 and a generated voltage of 0.7 V or more, said Q value being the amount of electric charge per a unit area of a polymer electrolyte membrane with an electrode only on one surface, the other surface of said polymer electrolyte membrane free from an electrode being in contact with an aqueous sulfuric acid solution of PH 1, and said electrode being in contact with a nitrogen gas, and said generated voltage being measured with the air supplied to an oxygen electrode and pure hydrogen supplied to a fuel electrode, at a pressure of 100 kPa, a utility percentage of 50%, a relative humidity of 50% and a temperature of 85°C for both of said oxygen electrode and said fuel electrode, and at a current density of 0.2 A/cm^2.

26. (new): A membrane electrode assembly comprising a pair of opposing electrodes each having a catalytic layer, and a polymer electrolyte membrane sandwiched by said electrodes, part of said catalytic layers being projecting into said polymer electrolyte membrane, wherein the projection depth of said catalytic layer is 0.5 μm or more and less than 5 μm, and wherein said membrane electrode assembly is obtained by hot-pressing said polymer electrolyte membrane sandwiched by a pair of said electrodes in a state that 3-20 weight% of an organic solvent based on said polymer electrolyte membrane remains in said polymer electrolyte membrane.

27. (new): A membrane electrode assembly comprising a pair of opposing electrodes each having a catalytic layer, and a polymer electrolyte membrane sandwiched by said

electrodes, part of said catalytic layers being projecting into said polymer electrolyte membrane, wherein the projection depth of said catalytic layer is 0.5 μm or more and less than 5 μm, wherein said membrane electrode assembly is obtained by hot-pressing said polymer electrolyte membrane sandwiched by a pair of said electrodes in a state that 3-20 weight% of an organic solvent based on said polymer electrolyte membrane remains in said polymer electrolyte membrane, and wherein said polymer electrolyte membrane is made of a sulfonated hydrocarbon polymer that may contain oxygen in its skeleton or other substituent groups that a sulfonic group, said sulfonated hydrocarbon polymer being selected from the group consisting of sulfonated polyetheretherketone, sulfonated polysulfone, sulfonated polyethersulfone, sulfonated polyetherimide, sulfonated polyphenylene and sulfonated polyphenylene oxide.